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Open Cut Coal Mining

• • IN INDIANA

VESTING ONE CROP, PROVIDES ANOTHER

THE PICTURE ON THE COVER . . .



. . . The vigorous growth of timber depicted here is located a few miles south of Dugger, Indiana, on land that 20 years ago was eroded and abandoned farms not salable at \$25.00 an acre. These trees are now valuable pulpwood. In ten more years they can be harvested as prime timber.

OPEN CUT COAL MINING IN INDIANA



Harvesting One Crop, Providing Another



THE INDIANA COAL PRODUCERS ASSOCIATION
524 GRAND OPERA HOUSE BUILDING
TERRE HAUTE, INDIANA

FOREWORD

THE READER of this booklet will find that coal mining by the Open Cut Method is not only a branch of the Industry that is vital to the industrial economy of the State, but also does important and continuing conservation work with a scientific land use program, which through the years, will improve rather than destroy mined-over land. The pictures speak for themselves. The articles were written by people who are personally familiar with the conservation work that is being done, most of them not in any way connected with the coal industry.

Generally speaking, the lands already mined may be put to several uses—Forestry, Pasture, Recreation, Wild-Life, Real Estate Development. The Indiana Coal Producers Association through a professional staff is assisting its member companies in putting their lands to the best possible use, keeping in mind owners' needs, community benefits, State and national welfare.

There is herein depicted by words and pictures some of the accomplishments and some of the obstacles to future endeavor, as well as the economic importance of Open Cut Mining to the State of Indiana.

The Indiana Coal Producers Association is deeply appreciative of the efforts of the Indiana Department of Conservation, Indiana Farm Bureau, Purdue University and other agencies for the assistance given in determining the proper use of the land and in helping to carry the development to a successful conclusion. To the authors of the various articles in this booklet the Association is deeply grateful. Their views as citizens of Indiana, are a true reflection of informed public opinion concerning Open Cut Coal Mining in its continuing conservation program.

Land Use Is Planned Scientifically As Adjunct to Open Cut Coal Mining

By L. E. SAWYER, Director,
Division of Forestry and Reclamation, Indiana Coal Producers Association

THE REVEGETATION of mined-out areas, through the planting of forest trees, was started by some of the more far-sighted Open Cut mine operators in Indiana in the spring of 1918. Complete records are not available of all the early plantings, but those on which records can be obtained show that by 1926 planting had been started by the Enos Coal Mining Company, Patoka Coal Company (now a part of Ayrshire Collieries Corporation), Maumee Collieries Company, and Central Indiana Coal Company.

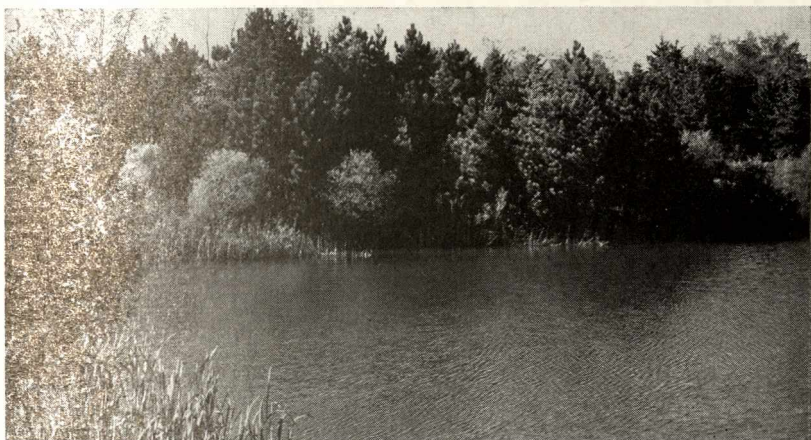
Between 1926 and 1930 other companies began taking an active part in that program. By 1930 nine of the then large Open Cut mining companies were committed to a program of planting on their mined-out lands. The results of some of these early

plantings are outstanding. Survival of most species has been good and the growth rates have exceeded those of the same species planted on adjacent undisturbed land.

No previous reforestation had ever been made on land of that character so there was no backlog of practical experience to guide the foresters called upon to recommend the species of trees to be used. Conifers were set out in the largest numbers and included the native red pine, white pine, jack pine, spruce, and American larch, as well as the then popular introduced Scotch and Oriental pines and Chinese arborvitae. Hardwoods, including black locust, black walnut, tulip poplar, chestnut oak, catalpa and red oak were used in smaller numbers.

The jack, red and white pines are

This Clay County scene is typical of the results obtained from Indiana Open Cut mine owners' early plantings. The trees pictured were planted in 1933-34. They are already marketable for pulpwood or props and with a few more years' growth will supply saw timber to replenish Indiana's dwindling supply.



the outstanding conifers in the plantings, in that order. All of these trees have made extremely rapid growth. The majority of trees in these old plantings range from 3 to 6 inches in diameter and 35 to 40 feet tall. Especially thrifty individuals, over 6 inches in diameter and 45 feet or more in height, are not uncommon. The jack pines, an early seed producer, have been bearing viable seed for several years. Natural reproduction of these species, ranging from 1-year old seedlings to trees 7 feet in height, is common in all areas where they have been planted, even as recently as 1934.

In 1941, partly as a result of attention centered on these voluntary experimental plantings, legislation was obtained requiring every Open Cut mine operator to revegetate the land from which the coal had been removed.

The revegetation program now being carried on by the members of the Indiana Coal Producers Association is not a tree-planting program aimed at keeping down adverse public opinion. The program is built around a policy of proper land use determined by soil tests to ascertain the uses to which the waste banks are best adapted. Mined lands that are fertile enough and the adjacent unmined areas are devoted to pasture. On areas of higher fertility not large enough to develop for pasture, seedlings of the more rapidly growing deciduous trees are being planted. Mined areas of lower fertility are planted to a variety of conifers.

In addition to the trees that are being planted nature has taken an active hand in the revegetation. Extensive areas are covered with volunteer stands of cottonwood and sycamore, with smaller quantities of sweet gum, ash, elm, black cherry and in the vicinity of existing wooded areas, with oaks and hickories. These trees are doing well. One area of 180 acres, mined in 1926, now supports a heavy stand of cot-



Scientific soil tests indicate growth possibilities and proper planting time. Jack Winchell (right), District Forester of Indiana's Department of Conservation and L. E. Sawyer, sample land in Greene County.

tonwood and sycamore. Most are between 10 and 14 inches in diameter.

There are many problems that remain to be solved before these mined-out lands and other holdings of the companies can produce the maximum of benefit to the communities near which they are located and to the companies that own them. Information gained from the program of early plantings, from cooperation with the Division of Forestry of the Indiana Department of Conservation, and the Departments of Forestry and Agronomy at Purdue University, from experimental plots established in cooperation with the Central States Forest Experiment Station, and from a graduate research fellowship established by the Association at Purdue, will solve many of these problems.

State Forester Praises Progress In Restoration of Lumber Industry

By RALPH F. WILCOX, *Indiana State Forester*

A MAJOR concern of the Indiana Conservation Department is the welfare of Indiana forest lands, for properly planned, protected and controlled, these lands can restore to some degree, Indiana's lumber industry to the importance it once held. To this extent, therefore, the Division of Forestry in the Indiana Conservation Department, representing the people of the State of Indiana, is a keenly interested partner in the reforestation work of the State's Open Cut mine owners.

A considerable area of the land which is being mined by the Open Cut method is potential forest land to begin with. The areas now being touched by the mining operations in many cases are to quite a degree depleted from an agricultural crop standpoint because of lack of good topsoil, wasteful farming practices that have worn out the land, and natural erosion that carried away the soil after the original forests were cut. Cost of rehabilitation by lime, fertilizer, cover crops and drainage does not appear to be economically feasible. Other areas from which forests had not been cleared are in a sorry state because of over-cutting of timber, the burning over

of large areas, presence of cull and weed trees, or grazing by livestock. The latter practice, through destruction of the young growth, is more harmful to a forest area than is a forest fire, except that it takes longer for the final ruin to become apparent.

The planting program of the Open Cut mine owners is putting most of the land they mine back into condition as productive forest land. This will restore the usefulness of the land and assist in perpetuating the important timber industry in Indiana. Continuing crops of merchantable timber, properly cut, will contribute greatly to the economy of the surrounding areas.

Because of the importance of the timber industry to Indiana, the Conservation Department has obtained two large areas of mined land which are now parts of the State forest system. Just recently a small pulpwood crop was harvested by the State from one of these tracts and the experiment proved that such a crop is profitable.

There are several stands of timber now ready to be harvested on land owned by Open Cut mining companies as a result of the early plant-

Red and Jack pines 12 years old transform mined areas into woodland scenes like this, a man-made forest on Open Cut mined land in Pike County.





Four years after planting trees cover the mine banks with the verdure of budding forests and natural reproduction has begun. Pictured are trees planted in Pike County in 1941, photographed in July, 1945.

ing experiments they conducted. The value of these timber crops will increase greatly each year because of the scientifically planned plantings that are now being made by the industry. Through the assistance given the Conservation Department by the Division of Forestry and Reclamation of the Indiana Coal Producers Association the hit or miss methods of early planting days have been supplanted by orderly, studied methods. These insure the use of species suited to the soil, carefully placed to obtain maximum use of the areas.

Purchase of planting stock from the State nurseries has helped the State maintain this valuable branch of the Division of Forestry and also has provided the mine owners with homegrown species of trees whose survival on the mined areas for the most part, is certain.

Open Cut mining in one sense of the word is helping to conserve the State's mineral resources through mining methods that eliminate waste and recover virtually 100 percent of the coal uncovered by the shovels and drag lines. It is gratifying that

the harvesting of a resource, namely coal, does not stop there, however. Future generations of Indiana will benefit from the second natural resource which is now being reestablished on the same lands, for timber is a natural resource which has suffered greatly from wasteful methods which have seriously impaired good forest production.

The Indiana Coal Producers Association slogan—"Harvesting One Crop and Providing Another"—is one which might well apply to the activities of all persons who profit from the utilization of natural resources.

Whether coal is mined or not by the Open Cut method obviously is not within the province of the Division of Forestry to decide. It is however within the scope of the State Division of Forestry to assist and cooperate with the Division of Forestry and Reclamation of the Indiana Coal Producers Association in its organized effort to reforest and rehabilitate the residual mined areas of its member companies. It is gratifying to state that such mutual assistance and cooperation does exist.

Time, Experience Are Big Factors in Revegetation Plan

By DANIEL DENUYL
*Associate in Forestry,
Purdue University*

TIME is the most important factor in the revegetation of land turned back to permit recovery of coal by the Open Cut mining method. Not only do tree crops require years for their production, but the soil itself needs time to reach the proper state to support vegetation.

Experience has shown that it is not possible to send planting crews in immediately behind the miners and their machinery. Instead, nature insists upon an interval in which to prepare the soil brought up to the surface by the mining. Then, given sufficient time, nature itself would provide cover on these man-made mine banks.

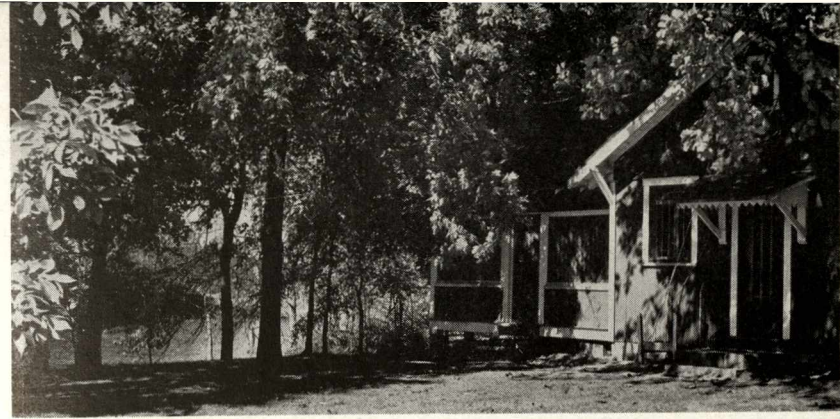
However, man is impatient and so trees are planted to hasten the establishment of forest cover on such sites. The trees must be properly planted and cared for as the particular species require in order that a good crop of forest products can be grown.

Experience has provided much information on mine bank plantings but much still remains to be learned about these man-made forests and much more experimental work must be done before maximum tree crops can be obtained.

The mine owners seem determined to establish forests on the mine bank areas and are cooperating with forestry and soil experts in the development of their revegetation program.



Man-made forests have become so dense that it is difficult to obtain photographs in their interiors. Here is an example of the growth on Clay County land that was reforested in 1927. Twenty years of experiments show growth is more rapid, more luxurious on mined land than on adjacent undisturbed soil.



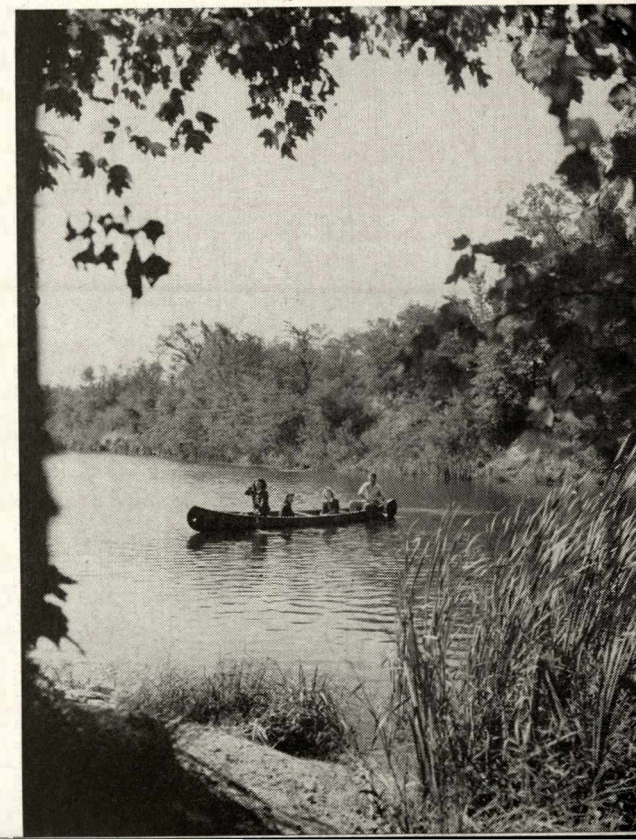
MINED-OVER LANDS PROVIDE NEW PARKS, RECREATION SPOTS FOR SOUTHWESTERN INDIANA



An inviting recreation spot (upper right) is built along the shores of a Greene County lake created by Open Cut coal mining. Its owners enjoy a carefree Summer life just off a good road and but a few miles from urban centers.

At Linton many community activities center around the Community Cabin pictured at the left above. The community house is built at the edge of a 600-acre tract of Open Cut mined land which with its picturesque lakes, rearing ponds and woodlands is now a public park.

Boating on the clear, blue waters of man-made lakes surrounded by tree-covered slopes appeals to young and old alike as the canoeists demonstrate in the picture at the right. The lakes also appeal to the true fisherman whether he is outfitted with costly equipment or relies upon a bamboo pole and a worm as does the elderly Hoosier at the left headed for his favorite spot. It is a spit of land jutting into one of the lakes created by Open Cut mining, and it is full of big ones.





Boating and fishing are Summer time lures for those having access to the lands and lakes of Open Cut mined territory. Owners would open many of their properties for general public use were it not for existing liability laws.

Liberalized Liability Laws Would Open Large Areas to Public Use

By A. S. THOMAS,
*Director, Tax and Legislative Department,
Indiana Farm Bureau*

PRESENT Indiana law making owners liable for legal action in connection with accidents occurring on their properties prevents thousands of Hoosiers from enjoying the recreational facilities potentially present on land mined and reforested by the state's Open Cut coal mining industry. This is particularly unfortunate at the present time when the public's interest in such matters is evidenced by the popularity of the Indiana State Park system and the constant efforts to widen its scope. Mined areas could provide equally interesting and valuable facilities.

In southwestern Indiana hundreds

of acres of land have been reforested and scores of lakes have been created by Open Cut coal mining companies. Some of these areas have been opened for recreational use through municipalities or organizations that assume responsibility by taking title to the land by purchase, lease or gift. However there is much land on which the mining companies desire to retain title but which, I am sure, they would throw open for public recreational use if they could be assured freedom from nuisance suits. There is nothing selfish in this viewpoint, since it is evident that anyone who creates recreational facilities and makes them

available for free public use has performed a notable public service and should not be subjected to nuisance suits and legal penalties in return.

I think it is very necessary that a law be drafted which will encourage the creation of lakes and recreational areas on properties such as those owned by the mining companies. The 1945 session of the General Assembly did enact such a bill but it was too drastic and did not receive final approval.

I believe suitable legislation by the 1947 General Assembly would be in the public interest since it would eventually open to the public excellent areas for hunting, fishing, boating, swimming and other outdoor activities. Many persons privileged to use such areas by virtue of membership in organizations controlling them travel great distances to avail themselves of the opportunity. It seems like a waste of a great Hoosier asset to have similar use by all members of nearby communities prevented because of present liability laws.

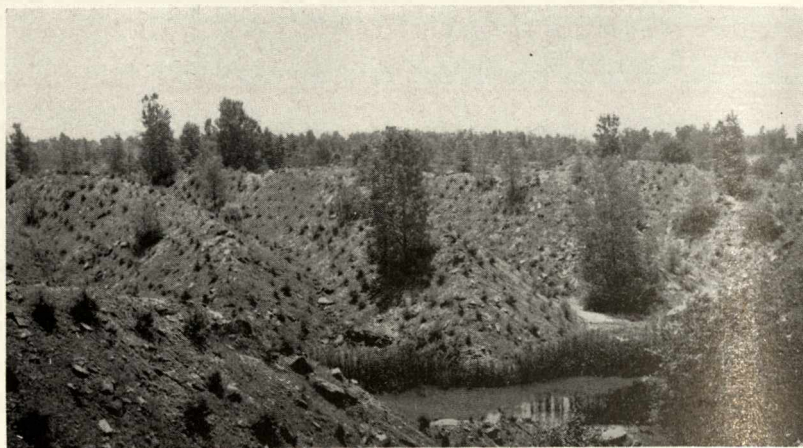
Open Cut Mining Touches Only Tiny Fraction of Land

DESPITE the importance of the Open Cut mining industry to Indiana, coal suitable for recovery by this process is found in only 11 counties. The land area involved in past, present or contemplated operations with present mining methods is *less than one-fourth of one percent* of the state's total area.

The amount of land owned or leased by Open Cut mining companies is not a measure of the area to be mined. Often portions of tracts so controlled contain no coal; other portions have coal of insufficient quantity or too deeply buried to be mined profitably. In these cases the land will be used only in connection with the companies' revegetation and reclamation program.

Here is a picturesque man-made lake, one of three on a 110-acre tract of Vigo County land mined just four years ago. The tract has been obtained by the American Legion Post at Riley which will build its home on a high knoll affording this view.





Nature starts its own reforestation program, as these large volunteer trees show, but its plantings lack density and regularity so Indiana Open Cut mine owners purchase seedlings from Indiana State Nurseries which are planted in a pattern scientifically designed to best utilize every portion of mined land. Here the seedlings dot the landscape at six-foot intervals.

Trees Planted at Mine Companies' Expense Already Yielding Cash Crop

Condensed from Terre Haute Star, Nov. 11, 1946

TREES GROWN on Indiana's Open Cut mined lands are now being harvested for pulpwood from which paper will be manufactured in American mills to help alleviate the acute worldwide paper shortage.

First crop of pulpwood from mined over areas was cut during the fall of 1946 by the Division of Forestry of the Indiana Department of Conservation. Profit from its sale went directly to the State of Indiana.

The wood just cut came from the Greene-Sullivan State Forest one mile east and about three-fourths of a mile north of Bucktown in Greene County. The land was mined in 1928 and 1929 by the Central Indiana Coal Company and had been reforested by its owners during the early years of the voluntary reforestation program. The Depart-

ment of Conservation obtained the 1700-acre area from the Central Indiana Coal Company as a gift to the state's conservation program.

The forest is now on a revenue-producing basis and, although less than 18 years old, it will be able to "take care of itself" through natural reproduction of the sycamores, maples, cottonwoods and other trees that are well-established there, according to District Forester S. J. Hensler.

Periodic harvesting of the pulpwood will serve to thin out the stand and permit better growth of the younger trees. It is proving the economic wisdom of providing this new crop where the land already has yielded coal, one of the state's greatest natural resources.

Open Cut Mine Owners Buy One-Third Of All Stock Grown in State Nurseries

By RICHARD W. RAMBO, *Indiana State Nurseryman*

TWENTY-ONE member companies of the Indiana Coal Producers Association are among the biggest customers of the Indiana State Nurseries, slightly over one-third of the entire output having been purchased for the 1947 planting season. To reforest 2,500 acres of land already tested, mapped and approved for planting by the Division of Forestry of the Indiana Department of Conservation, the Association has contracted for 2,242,000 seedlings.

This is the first time in the history of the Association's organized planting that it has been possible for the State's Nurseries to provide all of the required planting stock. The Association now places its orders four years in advance of delivery date to permit the State to plan its nursery production to meet the needs of one of its largest cash customers.

State Nursery stock will be supplemented in the 1947 planting season with direct seeding of walnuts to make a grand total of 2,247,000

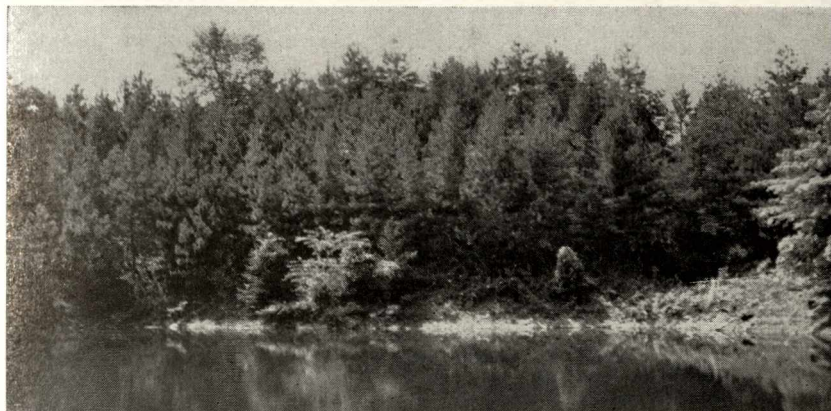
plantings. The land to be reforested is approximately 500 acres more than the area covered by mining operations in the preceding fiscal year.

An all-time record of 2,600,000 plantings was set in 1946 by members of the Association, the high figures having been obtained in overcoming the wartime lags caused by shortages of labor and planting stock.

A review of the figures for total nursery stock produced by State Nurseries in Indiana and stock purchased by the Indiana Coal Producers Association in the past few years is of interest, as follows:

Year	Total Production	Used by Coal Companies
1944	2,236,000	733,300
1945	2,995,600	1,354,200
1946	4,262,800	1,729,500
1947	5,666,600	2,242,000
Totals	15,161,000	6,059,000

These trees, 6 inches in diameter, 35 feet tall, grow on Pike County land mined in 1933. All planting on mined land is done at the expense of the mine owner as a private enterprise. The state does none of the planting, bears none of the expense.



Coal Recovered by Open Cut Mining Otherwise Would be Lost to Posterity

By LAFE STEWART

Chief Engineer, Maumee Collieries Company

OPEN CUT mining is the process of removing the relatively shallow earth and rock covering from mineral deposits and the recovery of these natural mineral resources by direct mining or quarrying from the exposed seams. The oldest form of mining known, the Open Cut process is not peculiar to the coal industry but is used universally in the production of limestone, iron ore, silica, clay, shale, gravel, sand and other minerals.

Like other minerals, coal is found

In Open Cut mining the overlying earth and rock are removed by large electrically-operated draglines (pictured) or shovels. The seam of coal visible in the foreground then is recovered by smaller loading shovels.

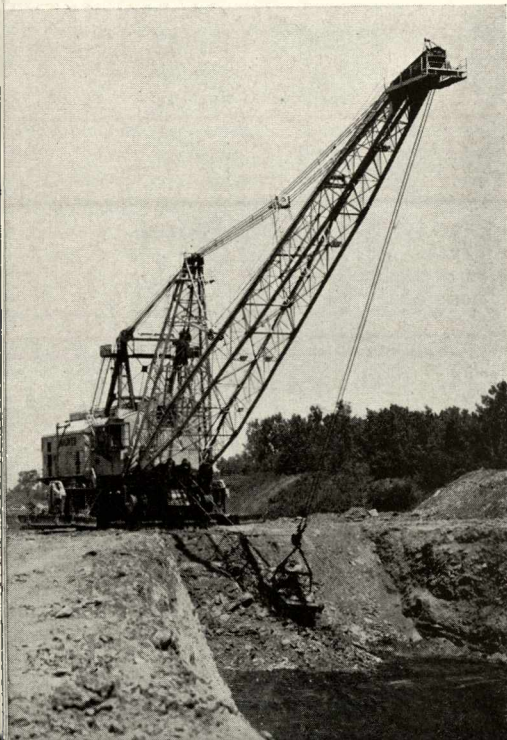
in layers or seams. Where these seams lie close to the surface underground mining is physically and economically impossible because the strata above are so weak that the expense of pillaring and timbering to support the overlying surface is prohibitive. Increased accidents and inability to utilize modern mechanical equipment combine to raise underground production costs of these shallow mines so that coal so produced cannot compete with other fuels. As a result much unmined coal had been abandoned.

Thus there would have been left hundreds of millions of tons of coal—one of the greatest of nature's resources—unrecovered and lost to posterity forever, were it not for the modern Open Cut method.

In the Open Cut process the overburden of earth and shale or rock is turned back by large electrically-operated shovels or draglines which work forward and back in successive cuts of varying widths. The coal thus exposed is mined by smaller loading shovels, which pick up the fuel and deposit it in trucks for transportation to the preparation plant. There the coal is crushed, washed and screened to obtain marketable sizes of fuel, free from impurities.

Because the entire Open Cut process is performed in the open and with no need for leaving supporting pillars of coal, it recovers virtually 100 percent of the coal deposit.

Open Cut mining is a process termed by the U. S. Bureau of Mines "... a means of preventing waste of a natural resource which cannot be replaced." In Indiana it is even more. Through its reclamation program the Open Cut mining industry is providing a natural resource of timber to replace the mineral resource it has harvested.



230 Years' Crops
Required to Equal
Coal in One Acre

Coal Mining Basic
Indiana Industry;
All Share Benefits

By C. C. LYDICK

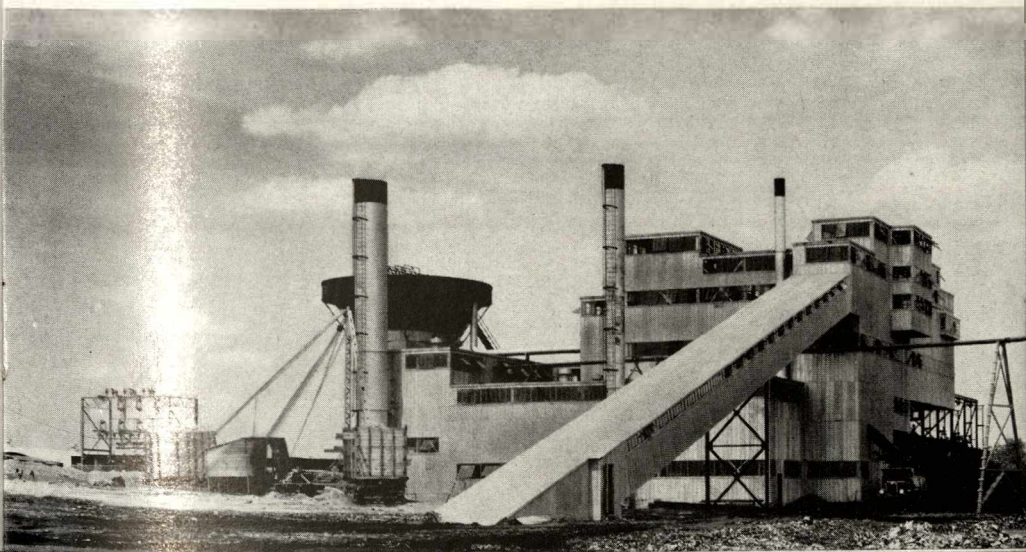
Managing Director,

Coal Trade Association of Indiana

VALUE of the average amount of coal produced from an acre of Indiana land by the Open Cut process is more than 200 times the value of the average annual farm crop on the same land. A single acre having a five-foot seam containing 7,000 tons of merchantable coal creates \$16,000.00 of original wealth at present prices for coal. This wealth channels out through the community in salaries, wages, materials, supplies, freight and taxes, all to the economic welfare of the State and the Nation. The same acre planted in corn will return only about \$70 at present values. *It would take 230 years at these rates for one acre of land to produce as much wealth by agricultural methods as is now produced by Open Cut coal mining.*

COAL MINING, with a capital investment of more than 100 million dollars, and an annual payroll of 30 million dollars, is Indiana's basic industry. Its importance to the State's economy may be measured in two ways. First, it creates original wealth through the recovery of a natural resource — original wealth amounting to approximately 60 million dollars annually poured into the streams of Indiana commerce. Second, it provides the fuel upon which all industry is dependent and without which few modern industrial processes could be carried on. The benefits from the latter

Coal from the open pit goes to modern preparation plants like this one where it is carefully screened, washed, graded and treated for the particular use designated by its purchaser. Coming from the same seams, it is the same coal in every respect as that mined in Indiana by any other method.



phase are so vast as to be almost incalculable.

Indiana's coal production ranks sixth in the nation. During 1945, Indiana mines produced 25,500,000 tons of coal, 55 percent by the Open Cut method and 45 percent from deep mines. This coal, at an average f. o. b. mine price of \$2.31 a ton, was worth nearly 60 million dollars. With approximately 90 percent of the coal transported to the consumer by rail, and estimating an average freight rate of \$1.75, the rail transportation cost added nearly 40 million dollars to the industry's economic importance to the State. The remaining 10 percent, handled by trucks at an average transportation cost of approximately \$1.00 per ton, sent over 2½ million dollars more into the State's business channels.

Indiana coal is a general utility fuel, suitable for heating, steam power, and other commercial purposes. Practically all of the coal mined in the State—certainly 100 percent of that mined by the larger companies—is carefully washed or otherwise cleaned, graded and treated for the particular purpose it is to serve. It is widely sought for industrial use in other states and during 1945 approximately 65 percent of the State's production was shipped outside Indiana.

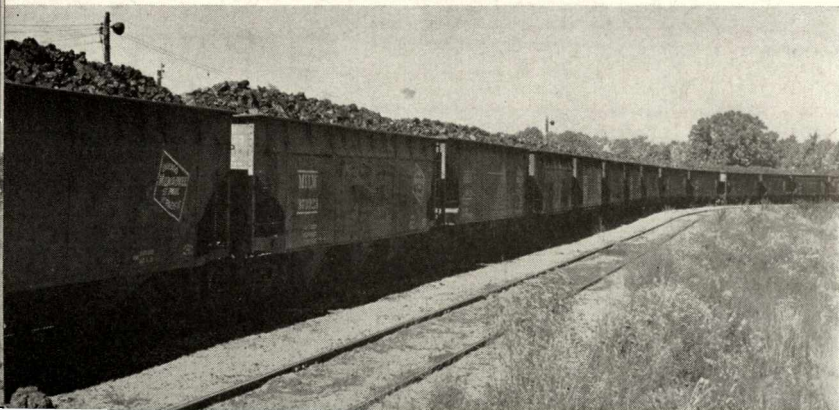
However, outside markets are highly competitive and the extent to which they will use Indiana coal

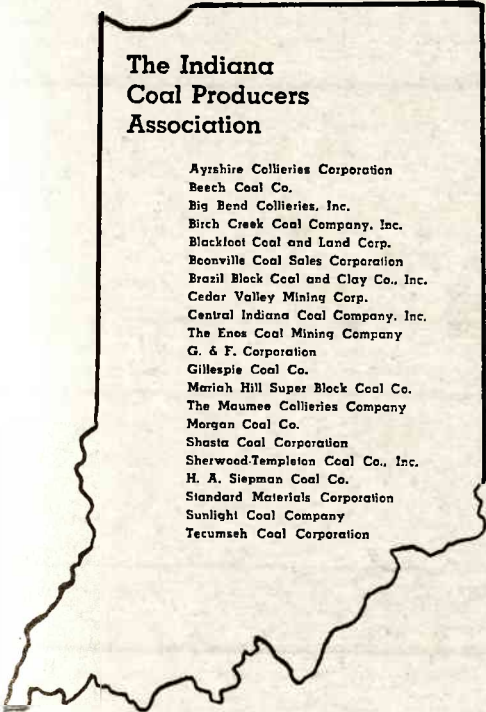
is dependent upon the delivered cost of the fuel. Thus any factor tending to increase the cost of Indiana coal will tend to decrease the outside markets. The cost of labor and machinery used in coal production is roughly equal in all coal production areas. Other and more variable factors which restrict Indiana's coal production are freight rates, taxation, and additional costs that might be saddled on the industry through punitive legislation.

Increased production costs caused by increase in any of these variable factors means a corresponding higher cost to the consumer and a restriction of markets for Indiana coal. This in turn will lower the production total, resulting in higher unit production cost and a continuing spiral of increased cost to the consumer. The resulting decrease in coal output would be a serious blow to the entire economy of the State for it would cause reduced employment, lower tax returns and stagnation of capital investment. Its attendant effect upon community and state business totals would be staggering and would affect the pocket-book of every resident of Indiana. The 30-million-dollar payroll covering 10,000 employes of the coal industry in Indiana is a material factor in our economic welfare.

Coal is basic. What hurts coal, hurts everyone and what helps coal, helps us all.

From the preparation plant the coal flows to homes and industries; the wealth it creates benefits every citizen of Indiana.





The Indiana Coal Producers Association

Ayrshire Collieries Corporation
Beck Coal Co.
Big Bend Collieries, Inc.
Birch Creek Coal Company, Inc.
Blackfoot Coal and Land Corp.
Beonville Coal Sales Corporation
Brazil Block Coal and Clay Co., Inc.
Cedar Valley Mining Corp.
Central Indiana Coal Company, Inc.
The Enos Coal Mining Company
G. & F. Corporation
Gillespie Coal Co.
Marion Hill Super Block Coal Co.
The Maumee Collieries Company
Morgan Coal Co.
Shasta Coal Corporation
Sherwood-Templeton Coal Co., Inc.
H. A. Siepmann Coal Co.
Standard Materials Corporation
Sunlight Coal Company
Tecumseh Coal Corporation

A BASIC INDIANA INDUSTRY, WHILE HA



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